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Older adults' experiences of internet-based Vestibular Rehabilitation for dizziness: a longitudinal study

Abstract

Objective: Factors influencing engagement with self-managed rehabilitation are not well understood, but evidence suggests they may change over time. Despite increasing digitalisation of self-managed interventions, little is known about the role of internet-based interventions in patients' experiences of self-directed rehabilitation. This longitudinal qualitative study investigated individuals' on-going experiences of internet-guided, self-managed rehabilitation within the context of rehabilitation for dizziness. Methods: Eighteen adults aged fifty and over who experienced dizziness used the 'Balance Retraining' internet intervention for six weeks. Participants took part in semi-structured telephone interviews at two week intervals to explore their experiences. Data were inductively thematically analysed. Results: The internet intervention was reported to facilitate engagement with rehabilitation exercises, providing motivation to continue through symptom reduction and simple but helpful strategies. It was perceived as informative, reassuring, visually pleasing and easy to use. Barriers to engagement included practicalities, symptoms, and doubts about exercise efficacy. Participants' perceptions did not always remain consistent over time. Conclusion: The internet intervention may be a feasible method of supporting self-managed vestibular rehabilitation. More generally, longitudinal findings suggest that appearance-related perceptions of online interventions may be especially important for initial engagement. Furthermore, intervention features targeting self-efficacy seem important in overcoming barriers to engagement.

Keywords: dizziness; rehabilitation; self-management; online intervention; older adults

Introduction

Patient self-management of rehabilitation therapies is increasingly important in today's society. With an ageing population and continuous advancements in diagnostic medicine across the Western world, a growing proportion of patients are living with long-term health conditions (Bower et al., 2012; Mc Sharry, Bishop, Moss-Morris, & Kendrick, 2013). The management of long-term physical health conditions requires a shift away from traditional models of acute medical treatment, to those focused on symptom-management, patient education and rehabilitation (Lawn & Schoo, 2010; Panagioti et al., 2014).

Rehabilitation solutions enabling patients to be less reliant on overstretched healthcare resources for skills to manage their condition are essential (Parker et al., 2014). Self-managed rehabilitation solutions also show promise for those individuals managing long-term illness in more rural contexts without easy access to health services and resources (Sinclair, 2015). However, such self-managed rehabilitation is often characterised by features that make it especially susceptible to poor engagement, including the prolonged and unsupervised nature of treatment and potential provocation of symptoms (Carter, Taylor, & Levenson, 2003; Kirby, Donovan-Hall, & Yardley, 2014; Yardley & Donovan-Hall, 2007). Indeed, patient engagement with self-managed physical rehabilitation therapies is often sub-optimal (Alexandre, Nordin, Hiebert, & Campello, 2002; Borello-France et al., 2010) which can be problematic for treatment outcomes and healthcare resource use (Alexandre et al., 2002; Hayden, Van Tulder, & Tomlinson, 2005; Vermeire, Hearnshaw, Van Royen, & Denekens, 2001).

In order to address this issue, it is important to understand the processes underlying this sub-optimal engagement. Quantitative studies have provided evidence that psycho-social (e.g. self-motivation, social support, self-efficacy: Brewer et al., 2003; Brewer et al., 2000;

Chen, Neufeld, Feely, & Skinner, 1999), situational (e.g. finding time and remembering to complete exercises: Borello-France et al., 2010) and condition-related (e.g. symptom severity, co-morbidities: Alewijnse, Mesters, Metsemakers, & Van Den Borne, 2003; Forkan et al., 2006) factors predict adherence to self-directed physical rehabilitation exercises. Despite numerous studies, there is a great deal of inconsistency in findings regarding which factors do in fact play an important role in adherence to rehabilitation. However, a recent systematic review proposed that self-efficacy, self-motivation, previous adherence-related behaviours, intentions and social support appear to most consistently predict adherence across a range of self-managed physical therapies (Essery, Geraghty, Kirby, & Yardley, 2016).

Qualitative research has illustrated the importance of seeking patients' experiences of engaging in self-managed healthcare interventions for improving understanding of patient decisions about engagement, and their perceptions of barriers and facilitators (Campbell et al., 2001; Medina-Mirapeix, Escolar-Reina, Gascón-Cánovas, Montilla-Herrador, & Collins, 2009; Rogers, Kennedy, Nelson, & Robinson, 2005). Some of this qualitative work suggests that the salience of factors influencing individuals' engagement (or otherwise) with such interventions may change over time (Campbell et al., 2001; Medina-Mirapeix et al., 2009). It would be valuable, therefore, to investigate participants' experiences and perceptions of their self-managed therapy at multiple stages throughout their rehabilitation to understand how these may change with continued participation. This may provide insight into the psychological processes underlying engagement-related behaviour in this context.

The means through which individuals are supported with self-managed rehabilitation therapies are also rapidly changing. Internet interventions are increasingly implemented as alternatives to paper-based self-management materials (Andersson, 2014; Kraft & Yardley, 2009) with advantages such as their ability provide user-tailored progress-relevant feedback

and feature audio-visual content (Griffiths, Lindenmeyer, Powell, Lowe, & Thorogood, 2006). Whilst research has investigated the role that an internet-based intervention might play in patients' experiences of self-directed therapy for mental health (Donkin & Glozier, 2012; Gerhards et al., 2011), equivalent research in terms of physical health therapies appears relatively lacking. A recent qualitative study of patients engaged in booklet-based Vestibular Rehabilitation (VR) therapy, with and without physiotherapist telephone support, reported that some participants felt that the support of their therapist was important to their perseverance with their exercises (Muller, Kirby, & Yardley, 2015). As such, it is unclear whether a standalone internet intervention would be perceived as similarly supportive. Donkin and Glozier (2012) reported an internet intervention for depressive symptoms was perceived to facilitate adherence to new behaviours, but further research is required in the context of a self-managed physical therapy.

The present study was carried out during the development phase of a primary care trial of an internet intervention to support self-management of dizziness amongst older adults (for trial protocol, see Geraghty et al., 2014). Dizziness is commonly reported amongst older adults within UK primary care (Lee & Elder, 2013), and is associated with falls, anxiety, depression and loss of independence (Friedman, Munoz, West, Rubin, & Fried, 2002; Yardley, 2000). A common cause is peripheral vestibular disorder, referring to dysfunction of the balance organ (Bird, Beynon, Prevost, & Baguley, 1998; Hanley, 2002). With little evidence for the efficacy of pharmaceutical therapy in relieving symptoms (Rascol et al., 1995; Wrisley & Pavlou, 2005), Vestibular Rehabilitation (VR) is now considered the optimal treatment for these individuals (Wrisley & Pavlou, 2005).

VR is a primarily exercise-based therapy that has been extensively demonstrated as effective in reducing self-reported dizziness symptoms (McDonnell & Hillier, 2015; Yardley,

Beech, Zander, Evans, & Weinman, 1998; Yardley et al., 2004). VR exercises are graded head, neck and eye movements that promote central nervous system adaptation to altered signals from the dysfunctional balance organ. Despite its effectiveness, referral to services providing therapist-delivered VR is often limited (Jayarajan & Rajenderkumar, 2003; Yardley et al., 2012). Yardley and colleagues (Yardley et al., 2012; Yardley & Kirby, 2006) have demonstrated that VR can be effectively delivered through educational booklets, with limited or no therapist support, greatly increasing the potential for access to this evidence-based approach (McDonnell & Hillier, 2015). Given the aforementioned digitalisation of supporting materials for self-managed conditions, alongside older adults' increasing use of the internet (Office for National Statistics, 2010), we developed a standalone internet-based VR intervention ('Balance Retraining') to support self-management of their dizziness.

In the current qualitative study we explored older adults' experiences of engaging in internet-based VR over a period of six weeks. In doing so, the study aimed to determine the acceptability and accessibility of an internet-based intervention for delivering VR to older adults with dizziness, and to provide insight into how they engage with, and utilise, such an intervention. To achieve this, the main objectives of the study were to gain a greater understanding of: how older adults experience internet-based VR, including their perceptions of its impact upon their symptoms; their perceptions of what may help or hinder their engagement with a self-directed VR programme; and how their experiences change over the intervention period.

Method

Design

This was a longitudinal qualitative interview study with adults aged 50 and over from the south of England. These adults were trialling the prototype of the ‘Balance Retraining’ intervention. Semi-structured telephone interviews were conducted at two-week intervals over six weeks. Full ethical approvals were obtained from the National Research Ethics Service and the University of (removed for review).

Balance Retraining was developed using a theory, evidence and person-based (Yardley, Morrison, Bradbury, & Muller, 2015) approach. It is a standalone digital intervention to deliver VR therapy that draws upon Behaviour Change Techniques (BCTs: Michie et al., 2013) to encourage regular and consistent practice of the relevant exercise behaviour. Users are provided with written directions and audio-visual demonstrations of the relevant exercises to provide sufficient behavioural instruction and modelling of the target behaviour. They receive tailored feedback from the intervention relevant to their answers to questions about their symptoms as a form of behavioural feedback and monitoring. Balance Retraining also includes information about the balance system, additional ‘symptom control’ techniques and ‘Retraining Stories’. The symptom control techniques are psychophysiological strategies drawn from Cognitive Behavioural Therapy (CBT) such as controlled breathing and thought control demonstrated as beneficial for managing dizziness and its associated symptoms, such as nausea and fatigue (Yardley & Kirby, 2006). ‘Retraining Stories’ recount others’ experiences of dizziness and engaging in ‘Balance Retraining’. Collectively, these features aimed to increase users’ self-efficacy and outcome expectations regarding VR therapy, and to reduce the psychological distress associated with their symptoms and their perceived barriers to treatment. The intervention content is broken

down into six main sessions that become available to participants on a weekly basis.

Intervention users are provided with email reminders about new sessions and can print off instruction and information documents. Further details about the intervention are provided elsewhere (Essery et al., 2015; Geraghty et al., 2014).

Recruitment

Purposive sampling was employed to recruit individuals aged 50 and over who experienced vestibular-related dizziness and were willing and able to access the intervention. Participants were recruited from NHS primary care, the Meniere's Society, and the University of (removed for review)'s Psychology participant volunteer pool. This was to ensure that participants included individuals who had sought help for their dizziness within primary care, and those who had not necessarily done so.

Three GP practices within (county removed for review) were identified with support from the local Primary Care Research Network (PCRN) on the basis of achieving maximum variation in practice deprivation indices. Practice deprivation scores indicate the proportion of a practice's patients living in the most deprived areas of the UK based on seven key indicators including income, employment and education level. The three selected practices searched their databases for patients reporting, or being treated for, dizziness within the preceding two years. Suitable candidates were invited to participate in the study via a mail-out pack. Subsequent telephone screening confirmed their continued experience of symptoms and access to the internet. Eligible patients were provided with access to the online intervention. Upon signing up participants completed an online consent form before progressing.

Individuals recruited via the Meniere's Society and the volunteer participant pool were also identified by staff searches of relevant databases. All lived within (county removed

for review). Suitable candidates were invited to participate via mail-out pack including a letter outlining the study for the individual's GP. The telephone screening and intervention access followed the same procedures as with NHS participants. However, their consent form necessitated confirmation that they had consulted their GP to ensure potential participants' medical safety.

Participants

Eighteen participants were recruited, eleven of whom were women. Recruitment stopped after eighteen participants as it appeared at this stage that data saturation had been reached. This was considered to have happened when continual review of the collected data indicated that no new topics and ideas appeared to be arising from successive participants' accounts. Participants ranged between 50 and 79 years with a mean age of 66.5 years ($SD = 9.15$ years). The mean reported duration of dizziness was 4.75 years ($SD = 7.41$ years) and ranged between two months and 25 years. All participants reported dizziness resulting from (or suspected by their GP to result from) a form of peripheral vestibular dysfunction. The majority of participants ($n=13$) had not received a definitive diagnosis for their symptoms. All but one participant had engaged in further or higher education. All participants took part in the first interview, fifteen took part in the second, and fourteen in the third, resulting in a total of 47 interviews. Two participants recruited via the Meniere's Society had previously used the Balance Retraining booklet upon which the online intervention content was based. This provided valuable insight into perceptions of the booklet compared to the online intervention.

Procedure

Participants were asked to access ‘Balance Retraining’ at least once per week for six weeks. After accessing their first online session, a convenient time for their first telephone interview was arranged with either the researcher (removed for review) or another member of the research team (removed for review). Each interview comprised a series of open-ended questions exploring participants’ experiences of the online intervention and VRT exercises. Interview one focused on management of dizziness, expectations and initial experiences of ‘Balance Retraining’. Interviews two and three asked about participants’ experiences since the last interview, and again about dizziness management, helpful features of the intervention, difficulties and concerns. Interview three also asked about participants overall experience and anything they felt they had learned. Figure 1 provides examples from the interview schedule. Recruitment continued until data saturation was reached. Interviews were audio-recorded and transcribed verbatim.

(Insert figure 1 about here)

Analysis

The analysis was led by the first author and arising codes and themes were discussed and agreed upon with all additional authors. An inductive approach to analysing participants’ accounts of their experiences was taken to ensure that themes were firmly rooted in the data rather than fitted to preconceived ideas (Patton, 1990). A phenomenological approach was taken to ensure that participants’ experiences and perceptions of their interaction with the intervention remained the focus of the analysis. Thematic analysis was carried out according to guidance set out by Braun and Clarke (Braun & Clarke, 2006) with the addition of memoing and constant comparison techniques advocated by grounded theory (Glaser & Strauss, 1967).

The first stage of analysis involved reading and re-reading interview transcripts to become familiar with the data. Meaningful elements of the transcripts were identified using open coding and NVivo software was used to facilitate and document the process. Throughout this iterative process, constant comparison (Glaser & Strauss, 1967) was used to ensure codes remain close to the data. This technique is drawn from grounded theory and allows closer consideration of whether certain opinions and experiences seem to be expressed in certain contexts or at certain times. The process also facilitates researchers' immersion in, and understanding of, the raw data through continual checking back to ensure that codes are applied appropriately. In the next stage, codes that appeared similar or closely related were grouped into themes and sub-themes. Memoing was utilised to maintain an audit trail and to facilitate transparency of the analysis (Glaser & Strauss, 1967). Previous examples of qualitative studies conducting thematic analysis whilst implementing techniques from grounded theory include patient and family experiences of therapy for chronic fatigue (Dennison, Stanbrook, Moss-Morris, Yardley, & Chalder, 2010) and older adults' views on advice for falls prevention (Yardley, Donovan-Hall, Francis, & Todd, 2006). The approach allowed thorough descriptions of the intricacies of the data whilst remaining firmly grounded in participants' own accounts. A coding manual was created to illustrate the structure and definitions of the themes, subthemes and their corresponding codes. These were discussed and agreed between all authors.

Constant comparison was further used to allow consideration of whether certain opinions and experiences were expressed in certain contexts. This was achieved by running matrix coding reports using NVivo software. These reports identified the frequency of occurrences of each code across different interview phases, and participant characteristics including age, gender and education level. These reports showed the total number of times a particular code arose, and by how many different participants, across each of the different

interview phases and characteristics. Comparing the frequency of the arising codes across different interview phases provided a sense of how salient these elements were to participants at various stages during the six week period. It also helped to understand whether experiences and perceptions seemed to vary substantially between men and women. The content of the codes was also reviewed to identify any qualitative differences between interview phases or characteristics. This approach to analysing the longitudinal aspect of the data draws upon assumptions underlying the person-based approach to intervention development. These suggests that the perceptions and ideas that participants' choose to discuss are indicative of the issues that are most pertinent and salient to them (Yardley et al., 2015). It became apparent that there was not sufficient variation in the ages or education levels of participants to make any meaningful comments about variations based on these characteristics. The patterns identified from this aspect of the analysis are discussed in the findings.

Findings

Overview

Thematic analysis of the 47 transcripts identified three themes encompassing ten subthemes whose key content are illustrated in figure 2. These themes related to: (1) perceptions of the Balance Retraining intervention; (2) facilitators of engagement; and (3) difficulties with engagement. An overview of each subtheme is provided with direct quotes from the data. Participants' gender, age and interview phase are indicated.

(Insert figure 2 about here)

Perceptions of ‘Balance Retraining’

Participants generally perceived the online intervention to be well presented, visually appealing and easy to use, all of which encouraged them to continue using it. Perceptions that focused on appearance-related issues, such as the visual presentation of intervention pages, tended to be raised more frequently in the early stages of the programme and less so later on.

With the exception of one participant, all were very positive about how simple, user-friendly and easy to navigate they found the online intervention, which seemed to enhance their overall experience of using the intervention:

‘A nice easy, friendly site, easy to get around, navigate, no harsh threatening colours, anything of that sort of nature, so a pleasant experience.’ (P202, M, 68, Interview 1)

One participant was less positive, viewing the intervention as overcomplicated and requiring further development; a view that did not change over the course of using the intervention.

No, in fact I find it over-complicated, more things to check up on, I don’t want to watch the videos again, it keeps on offering to let me, I don’t want to keep a chart of how I am getting on, because my reaction to each of the exercises is broadly the same. (P302, M, 76, Interview 2)

Reviewing this participant’s data overall, it is difficult to say why his views were so contrary to the majority; it may have simply been a matter of personal preference. However, he frequently expressed a desire to provide constructive feedback for the development of the intervention (as participants had been asked to do). It may be, therefore, that he was approaching the intervention from a relatively critical standpoint to provide what he felt was constructive criticism. The context in which the data was collected is particularly pertinent here, given the first author’s involvement in the intervention design as well as the data

collection and analysis. This individual's expressions of desire to provide constructive feedback may have been a response to this interactional context in which negative views about the intervention might have been difficult to express.

The opinion that the intervention provided new information and equipped users with new skills was expressed nearly unanimously. The audio-visual exercise demonstrations and the symptom control techniques were frequently cited as contributing to this. They were described as adding to participants' knowledge of how to manage dizziness, clarifying details about exactly how to do so, or providing a distraction from sensations of dizziness.

...and I certainly found the little video, with actually seeing somebody do it, very helpful, because like the nodding one, you know, the head up and down, I wouldn't have put my head that far back. [...] So that's very good in that respect because, you know, then you know exactly what to do, rather than perhaps misinterpreting it with just written instructions. (P204, F, 70, Interview 1)

A large proportion of participants perceived the Balance Retraining intervention to be supportive, reassuring and encouraging. The tailored feedback, 'Retraining Stories', and information about the exercises all contributed to this. These features helped participants overcome concerns and set-backs, manage expectations of the exercises, and were important in encouraging them to continue:

Yes, which is why I thought no I will continue because of the information that was there. I mean had I not had that information after a couple of days when I was feeling really dizzy I probably would have stopped, but I didn't because I had that information. (P505, F, 65, Interview 1)

Some participants found it encouraging to hear that others had experienced similar difficulties but had managed to improve their situation:

‘Well, it’s always encouraging, I think, to hear, you know, other poor old people are suffering as well, but, you know, and in fact it did help them. Yes.’ (P201, F, 76, Interview 1)

Those with previous experience of the booklet version of ‘Balance Retraining’ felt that these features of the online format made it more successful in terms of encouraging them to engage with the exercises:

Well I’ve been quite happy using the, with your, using your website. I find it so much more helpful, as I say comparing with a booklet, which I had for many years and I kept meaning to do the things and somehow with the computer and the website it’s just that extra incentive I think, [...] I think it’s really a good step forward away from the booklet definitely. (P201, F, 76, Interview 3)

Facilitators of engagement with Balance Retraining

Participants frequently discussed experiences that they found helpful in enabling them to engage in the Balance Retraining programme and to practice the exercises on a regular basis. Throughout their participation, users discussed their motivations to continue with the exercises fairly consistently, whereas perceptions of how the intervention had facilitated their engagement and of specific strategies they had implemented seemed to gradually lessen over time.

By far the most common motivations to continue with the exercises were participants’ perceptions that the exercises had already had a positive impact, either by reducing symptoms or enabling them to do more. Consequently they were very keen to continue with the

exercises and even increase the frequency of their practice in the hope of maintaining, or increasing, these benefits. With the exception of one, all participants discussed an improvement in their symptoms since beginning the exercises:

I tell you what, the last time I went rotational it was much slower, yes, and that really is a good thing because it meant that the ceiling light was just winding round gently as opposed to whipping round at a horrible rate. So I assume it is those exercises and I certainly am keeping them up. (P201, F, 76, Interview 2)

Yes, yeah, because I find, you know, there are things that I can do that I haven't been able to do for some years. Just silly things like hanging out the washing without sort of looking up and thinking, "Oh my goodness". (P410, F, 63, Interview 2)

Participants described specific strategies they had implemented in an attempt to help themselves practice their exercises consistently. A large proportion reported that making concrete plans had made them more likely to stick to their exercise routine and helped this to become almost an automated part of daily life.

Yes, I've got into the routine. I try to maintain the same times, roughly, at the beginning and the end of the day, and I think that's the first... that was the first thing I had to ensure that I didn't forget and so on. So I have managed to establish a routine and I found that the exercises, I can manage them. (P301, M, 79, Interview 1)

Participants also discussed a sense of personal responsibility towards helping themselves. This was expressed primarily as a necessity to push themselves and to be disciplined to improve their health, even when this might be uncomfortable or unpleasant.

And it is quite hard to discipline yourself to do it. Especially when it makes you feel a bit worse. You're sort of thinking, oh, you know, do I really want that, but I know

they're saying if it makes you worse, it's making you better. But.... it's sort of finding, it is sort of quite hard to sort..., to sit and you know, to sort of discipline yourself to do it. (P426, F, 66, Interview 1)

However, even when participants did experience an exacerbation of symptoms, there was an almost unanimous expression of being willing to persevere. This was usually expressed in terms of participants acknowledging that the exercises might take time to demonstrate results:

'No. I am one of those people, if it is going to help in the long term I will just keep doing it, because I realise things don't happen overnight. No, I've got no concerns about continuing at all.' (P505, F, 65, Interview 1)

Also of importance in facilitating users' engagement in the programme was the perceived simple and supportive nature of 'Balance Retraining'. Nearly all participants reported the exercises to be simple and straightforward and, therefore, not too much of a burden on their time and efforts.

...but I don't find the exercises intrusive, in fact I've sort of incorporated them into my daily routine now, and it's... even when I'm home or down my mum's or wherever, I find I can still do them without them interrupting my day, which is a good thing I feel. (P505, F, 65, Interview 3)

Difficulties with engagement in 'Balance Retraining'

Participants commonly mentioned difficulties they encountered with fully participating in their exercises and the online intervention during the earlier stages of the programme. Whilst a similar proportion of participants continued to discuss difficulties they faced over the duration of their participation, those that did seemed to report them less in the

later stages of taking part. In particular, participants' expression of doubts and concerns relating to the exercises vastly reduced across their participation. Furthermore, whereas all women mentioned other life events preventing them from fully engaging in the programme and more than three quarters mentioned experiencing technical difficulties, only three of the seven men mentioned either issue.

Certain practical issues proved problematic for participants regarding their engagement with Balance Retraining exercises. The most common of these was other life events being prioritised or lessening participants' motivation and time to dedicate the exercises. These events included family birthdays, visiting friends and family and looking after grandchildren. These sometimes took up time that might otherwise be dedicated to doing the exercises, but other times a conscious decision not to do the exercises was made to avoid inducing symptoms:

'I was about to start the third week, or third lot, but with it being Father's Day and my daughter's birthday I'm putting it off until this week.' (P402, F, 50, Interview 3)

If I have any problem at all it's the same as before, that it's just finding the time to fit it in to my daily routines. You'd think that now I'm retired I would have all the time in the world. (Laughing) Unfortunately, it's not the case, mainly because, you know, living on my own I just have to do everything; house, garden, shopping... (P422, M, 71, Interview 2)

Other practical issues that proved problematic for participants included technical difficulties. These sometimes resulted in users not being able to access sessions or made them feel frustrated and, therefore, unwilling to continue:

‘...you know, my email account was down and I couldn't access that Session 3... really stopped me almost in my tracks and I've done very little in the past week.’ (P422, M, 71, Interview 2)

A number of participants mentioned doubts about the exercises, predominantly relating to concerns about possible side-effects. They often described being fearful and apprehensive before beginning the exercises, largely due to the possibility of inducing their symptoms which, in turn, impacted on their willingness to engage. However, some described how they reduced these concerns by trying the exercises.

Well, I was a bit apprehensive because it kept saying that you might experience some of that dizzy, you might experience dizzy ... while you were doing the exercises and I must admit, I say apprehensive, because actually I don't want to trigger anything. So I was a bit, I suppose a bit sceptical and a bit unsure. (P402, F, 50, Interview 1)

Many participants mentioned exacerbation of their symptoms or other negative side effects such as a stiff neck or nausea, particularly when discussing their initial experiences. This left some concerned, especially when they were yet to experience any benefits, as it made it difficult to want to continue. However, whilst raising these concerns, many acknowledged that the website had explained that this initial exacerbation of symptoms was likely, and that they were willing to keep trying at least for a while. All but one participant who expressed these concerns talked about some form of improvement they had noticed by the final interviews:

‘I found it quite hard because it made me really dizzy to start with... I thought oh dear, I don't know that I can continue with this...’ (P505, F, 65, Interview 1)

‘Some of the exercises make me a bit a dizzy, but then that’s what the website said they would do.’ (P408, M, 62, Interview 1)

Discussion

Summary of findings

Older adults generally experienced the ‘Balance Retraining’ online intervention as supportive of their VR exercises and found it reassuring, accessible and visually appealing. As will be discussed, these responses to website features and usability provided insight into more fundamental processes underlying engagement with the intervention and changes in dizziness management behaviours (Yardley et al., 2016). These perceptions of ‘Balance Retraining’ seemed to contribute to their broader experiences of engaging in self-managed Vestibular Rehabilitation. Positive perceptions of intervention features seemed to contribute to participants’ perceptions that their continued engagement was facilitated by the encouraging and motivational nature of the intervention. These positive perceptions also seemed to have a buffering effect on certain barriers; the negative impact of concerns about exercises and experiences of symptom exacerbation were often lessened by the reassuring and supportive aspects of the intervention. However, on the rare occasion that perceptions of the intervention were negative, this had the potential to exacerbate barriers (e.g. negative perceptions of usability and technical problems). Participants’ accounts of their experiences revealed situations and events that both facilitated and hindered their engagement with the programme, and the longitudinal data revealed that these barriers and facilitators could change over time. These findings are summarised in figure 2.

Role of the online intervention

Certain elements of ‘Balance Retraining’, particularly the demonstration videos, tailored feedback and ‘Retraining stories’, seemed to prepare participants for what to expect and helped them to overcome problems. This resonates with existing research (Bennett & Glasgow, 2009; Gerhards et al., 2011), suggesting that managing participant expectations, providing personal contact and positive feedback are key to facilitating engagement. The present findings suggest that these features may promote continued engagement by providing reassurance and support, helping individuals to foresee possible problems and suggesting ways to overcome them.

Barriers and facilitators of engagement with Balance Retraining

Participants reported experiences that facilitated or hindered their adherence to internet-based VR. Perceived improvements in symptoms and abilities seemed a major motivation to continue. Other key facilitators included the perceived simplicity of the programme setting exercise routines. These perceived facilitators of adherence were similar to those identified by qualitative studies of different online self-managed therapy interventions (Bendelin et al., 2011; Donkin & Glozier, 2012), and of other self-managed physical therapies (Campbell et al., 2001; Marshall, Donovan-Hall, & Ryall, 2012; Medina-Mirapeix et al., 2009). Within the present study, symptom improvement and increased ability to engage in other activities stood out as important facilitators of engagement for participants. This perhaps reflects the debilitating nature of dizziness and individuals’ relief when they find something that helps. This is emphasised by the mundane nature of the activities that participants were so encouraged by being able to resume, such as hanging the washing out.

Participants also appeared motivated by a sense of responsibility to help themselves. Previous studies of internet interventions for mental health conditions have similarly reported a sense of duty to oneself (Bendelin et al., 2011; Donkin & Glozier, 2012) as a perceived facilitator of adherence. Within the present study, this sense of responsibility seemed to contribute to a willingness to persevere with the exercises even though they often initially exacerbated symptoms, thus reducing the potential impact of this barrier.

Perceived barriers to participants' continuation with their VR therapy included practicalities such as finding time and technical issues, and concerns about the exercises. Previous research suggests that many of these barriers, such as experiencing technical problems (Gerhards et al., 2011), perceived lack of time (Austrian, Kerns, & Reid, 2005; Medina-Mirapeix et al., 2009) and uncertainty about the therapy (Bendelin et al., 2011), are common to experiences of other self-directed physical therapies and technology-supported self-management interventions (Kirby et al., 2014). Amongst the perceived practical barriers, a greater proportion of women than men reported experiencing technical problems, or having difficulty fitting exercises in. The small sample and its disproportionate number of women may account for these findings. However, should these reflect real differences, women's greater experience of technical problems may be partially explained by research suggesting that, amongst older adults in the UK, women are significantly less likely to report use of online technologies (Office for National Statistics, 2016) and so perhaps are less familiar and less experienced in overcoming problems. An alternative interpretation is that men were simply less willing to report difficulties. This is consistent with literature which has highlighted men's reluctance towards help-seeking behaviours more generally, due to an unwillingness to express and discuss concerns (Yousaf, Grunfeld, & Hunter, 2015) and notions of such behaviours challenging traditional views of masculinity (O'Brien, Hunt, & Hart, 2005).

With regard to difficulties finding time, amongst these participants these reports were frequently related to other life events preventing individuals from being able to complete their exercises. Often, these life events revolved around other family members, such as looking after grandchildren, birthdays, visiting friends and family and arranging trips with friends. Should these findings demonstrate an actual gender difference in experiences, given that family-oriented activities have been more traditionally associated with a maternal role, this perhaps goes some way to explaining why women were more likely to discuss this as a perceived barrier than men. Indeed, studies have recognised that women's traditional familial and caring roles continue into retirement and can contribute to a comparative lack of 'leisure time' (Loretto & Vickerstaff, 2013).

The changing experience of Balance Retraining over time

The longitudinal study design was employed to identify patterns in participants' experiences over time, some of which did seem to change. In attempting to explain these changes, it is necessary to consider the possible underlying psychological mechanisms. For example, perceptions relating to presentation and usability of the online intervention arose far more in the early stages of the programme perhaps suggesting these are more important during individuals' initial experiences. This is congruent with established theories and models of persuasion and information processing proposing that users of online health information often base source-credibility assessments on superficial elements before considering in-depth content (Petty & Cacioppo, 1986; Sillence, Briggs, Harris, & Fishwick, 2006; Wathen & Burkell, 2002). Individuals often use this initial assessment to decide whether to continue using the source (Sillence et al., 2006). This highlights the importance of such positive impressions of the aesthetic and functionality aspects of the Balance Retraining intervention.

The perceived simplicity of ‘Balance Retraining’ appeared more instrumental in encouraging continuation in the early stages of the programme. This may reflect participants weighing up the costs and benefits of adherence to the programme (Horne & Weinman, 1999). In the early stages, they may not have experienced any improvement in symptoms (low benefit) and, therefore, it was important that the programme did not require much time or effort (low cost). However, as time progressed and individuals began to experience benefits (i.e. symptom improvement), the costs perhaps became less salient and so the fact that the intervention was so easy to use was no longer as important. This provides further evidence that engagement with internet-supported self-management therapies can be understood in terms of patients’ cost-benefit considerations (Donkin & Glozier, 2012; Horne & Weinman, 1999).

Over the course of the programme, individuals’ expressions of doubt about the exercises seemed to lessen. Taken alongside the widely reported perceptions that the intervention helped overcome problems, and provided a greater sense of confidence in managing dizziness, these findings are proposed to reflect participants’ increasing self-efficacy for managing their dizziness. Self-efficacy theory (Bandura, 1977) posits that a person’s perception of their ability to complete a given behaviour (their self-efficacy) is a strong determinant of whether or not that behaviour occurs. Self-efficacy is proposed to be influenced via four main processes: performance accomplishments; vicarious experience; verbal persuasion; and management of emotional arousal and physiological states (Bandura, 1977). Each of these processes can be illustrated within the current findings and, as such, it seems reasonable to suggest that Balance Retraining facilitated improvement in individuals’ self-efficacy for managing dizziness. For example, individuals’ expressions of desire to continue with the exercises having achieved initial positive outcomes could be seen as a form of performance accomplishment. Furthermore, the exercise demonstration videos and

‘Retraining Stories’ highlighted by many participants as valuable and supportive features, allow them to see others successfully practicing the exercises and hear about their achievements and, therefore, provide a form of vicarious experience. Many participants reported finding the tailored exercise feedback very supportive and encouraging which might be considered forms of verbal persuasion. Finally, many participants reported the symptom control exercises (designed to manage psychophysiological symptoms associated with dizziness, e.g. anxiety) as beneficial techniques, and the information and advice available to them via the intervention as instrumental in reducing worry and apprehension about the exercises. These might be considered to reflect participants’ management of their emotional arousal related to the exercises. The notion that the Balance Retraining intervention improved individuals’ self-efficacy with regards to managing their dizziness is also supported by the commonly reported perception that the intervention helped them overcome problems they experienced, and that they had more confidence in managing their dizziness. Self-efficacy tends to increase with successful performance of a given behaviour, by improving individuals’ perceptions of competence (McAuley, 1993). Increasing self-efficacy also allows individuals to overcome challenges associated with the behaviour with greater ease (Sniehotta, Scholz, & Schwarzer, 2005).

Limitations

The requirement for participants to be able to access an internet intervention may have excluded the experiences of less technically confident individuals. Such individuals are likely to have found the intervention more challenging and so may have experienced greater barriers to engagement. Furthermore, the demographic data suggests that this was a predominantly highly educated sample which may have excluded the experiences of less highly educated individuals. Information regarding socioeconomic status (SES) can only be

inferred from the data collected regarding participants' education level. However, it seems that despite recruiting participants from practices with varied deprivation indices, the sample was relatively well-educated. As such, the experiences and perceptions of the present sample may not be representative of those with lower education levels or those from lower SES backgrounds.

The interviewer's own characteristics, experiences and perceptions must also be acknowledged as fundamental in shaping data collection and analysis. It is important for the researcher to acknowledge how these may influence the nature of the data that is collected and their own interpretation of that data (Marks & Yardley, 2004). Whilst the interviewer was significantly younger than the average age of participants, this was not considered to have unduly influenced participants' involvement. The majority of instructions were provided to participants via the written study materials or via the online intervention itself. Furthermore, the interviews were conducted via telephone and so the interviewer's age was not evident. The sex of the interviewer should also be considered as a potential influence on data collection. For example, if the aforementioned difference between men and women's expressions of difficulties was, as suggested, due to men's unwillingness to acknowledge and discuss problems, the fact that the interviewer was female may have compounded this effect. Men may have been especially keen to appear competent and knowledgeable regarding their technology use, and therefore less likely to express difficulties to a female interviewer. Additionally, in the present study the first author led the data collection and analysis and was also closely involved in the online intervention design. This may have influenced the extent to which participants were willing to express negative opinions. However, as an attempt to minimise this likelihood, a second interviewer not involved in intervention development (initials removed for blind review) conducted a proportion of the interviews. Additionally,

interviewees were not explicitly informed about the first author's involvement in the intervention development to encourage honest expression.

It should also be considered that repeated contact with the interviewer may, in itself, have acted as motivation for individuals to persevere; a factor that would not otherwise be relevant in 'real-life' use of the intervention. Whilst the addition of telephone support to the intervention might be considered, previous trials of self-managed booklet-based VR demonstrated that even when telephone support was offered, it was not fully engaged with and did not significantly improve outcomes compared to booklet-based VR alone (Yardley et al., 2012).

Implications

Given participants' awareness of factors influencing their engagement in a self-directed physical therapy, it seems important that intervention designers seek patients' perceptions about what helps or hinders them at given intervals to most effectively address barriers. They should also consider some of the psychological processes that may underlie users' changing experiences across time such as cost-benefit assessments and perceptions of self-efficacy. This would result in interventions capable of tailoring support according to patients' changing perceptions regarding the challenges they face throughout their therapy, consistent with a person-based approach to intervention design (Yardley et al., 2015).

The study has also provided evidence of the feasibility and acceptability of a self-managed online intervention for older adults with long-term dizziness. Further work is underway (Geraghty et al., 2014) to determine the effectiveness and cost-effectiveness, but these early findings have important implications for how VR is delivered to patients. A

standalone internet-based intervention could provide immediate access to VR for those who otherwise would have an extensive wait and potentially free up existing audiology/physiotherapy resources for those requiring more complex treatment and assessment.

More generally, the findings provide useful insight into features of online interventions for self-managed rehabilitation that are likely to be acceptable, beneficial and encourage engagement. For example, features such as demonstration videos, tailored feedback on progress and accounts of shared experiences appear to be helpful managing individuals' expectations and helping them overcome potential problems. Instructions on planning where and when to carry out exercises helped embed them in daily routines.

Conclusions

An internet intervention was perceived as accessible and beneficial by older adults engaged in self-managed vestibular rehabilitation therapy and, therefore, may be considered a feasible method of supporting self-managed rehabilitation in this context. Participants' changing perceptions, revealed by the longitudinal study design, suggest that: appearance-related perceptions of an online intervention may be especially important for engagement in the initial stages of use; that individuals' decisions about engagement with such interventions may be based on a form of dynamic cost-benefit assessment; and finally, that intervention features targeting self-efficacy may be important in overcoming barriers to engagement.

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Figure 1. Example interview questions

Figure 2. Summary of findings